## CLAIMS

What is claimed is:

1        1.      A digital image processing method comprising:

2        providing digital image data of a plurality of colors of an image, wherein

3    the image data comprises a plurality of sets individually comprising mosaic data

4    of one of a plurality of colors at a plurality of pixel locations;

5        analyzing image data of one of the pixel locations with respect to image

6    data of another of the pixel locations; and

7        adjusting the image data of the one pixel location responsive to the

8    analyzing, wherein the adjusting comprises adjusting to one of denoise the

9    image data and sharpen the image data.


1        2.      The method of claim 1 wherein the analyzing comprises analyzing

2    image data of the one pixel location with respect to image data of a plurality of

3    other pixel locations.


1        3.      The method of claim 2 wherein the adjusting comprises adjusting

2    to sharpen the image data of the one pixel location responsive to the analysis of

3    the image data of the one pixel location with respect to image data of one of the

4    other pixel locations and to denoise the image data of the one pixel location

5    responsive to the analysis of the image data of the one pixel location with

6    respect to image data of another of the other pixel locations.


1        4.      The method of claim 1 wherein the analyzing comprises comparing

2    the image data of the one pixel location with image data of the another pixel

3    location.


1        5.      The method of claim 4 wherein the adjusting comprises adjusting

2    to denoise the image data responsive to the comparing determining a difference

3    of the image data of the one and the another pixel locations to be a within a first

4    set of values and adjusting to sharpen the image data responsive to the

5  comparing determining the difference of the image data to be within a second
6  set of values.

1      6.    The method of claim 4 wherein the adjusting comprises adjusting
2  to denoise the image data responsive to the comparing determining a difference
3  of the image data of the one and the another pixel locations to be within a first
4  set of values and adjusting to sharpen the image data responsive to the
5  comparing determining the difference of the image data to be within a second
6  set of values different than the first set of values.

1      7.    The method of claim 4 wherein the analyzing comprises applying
2  square root operations to the image data prior to the comparing.

1      8.    The method of claim 4 wherein the adjusting comprises adjusting
2  to denoise the image data responsive to the comparing determining a difference
3  of the image data of the one and the another pixel locations to be less than a
4  threshold and adjusting to sharpen the image data responsive to the comparing
5  determining the difference of the image data to be greater than the threshold.

1      9.    The method of claim 8 wherein the adjusting to sharpen the image
2  data comprises adjusting responsive to the comparing determining a difference
3  of the image data is less than another threshold.

1      10.    The method of claim 9 wherein at least one of the thresholds
2  comprises a single value.

1      11.    The method of claim 9 wherein at least one of the thresholds
2  comprises a transition period of a plurality of values.

1      12.    The method of claim 8 wherein the adjusting comprises addressing
2  a look-up table responsive to the comparing, and adjusting using values obtained
3  from the look-up table responsive to the addressing and configured to implement
4  the denoising for results of the comparing determining the difference is less than

5   the threshold and to implement the sharpening for results of the comparing

6   determining the difference is greater than the threshold.

1      13.   The method of claim 1 wherein the sets individually comprise

2   image data of no more than a single color.

1      14.   The method of claim 1 wherein the adjusting comprises adjusting

2   utilizing a robust estimation filter.

1      15.   The method of claim 1 wherein the adjusting comprises adjusting

2   utilizing a modified bilateral filter without division operations.

1      16.   The method of claim 1 further comprising demosaicing the sets of

2   the image data after the adjusting to provide composite image data capable of

3   being utilized to provide a representation of the image.

1      17.   The method of claim 16 wherein the composite image data

2   comprises data of more than one of the colors at individual ones of the pixel

3   locations.

1      18.   A digital image processing method comprising:

2      providing digital image data of a plurality of colors of an image, wherein

3   the image data comprises a plurality of sets individually comprising mosaic data

4   of one of a plurality of colors at a plurality of pixel locations;

5      filtering the mosaic data of the respective sets using a robust estimation

6   filter; and

7      demosaicing the mosaic data of the respective sets after the filtering to

8   provide composite image data capable of being utilized to provide a

9   representation of the image.

1      19.   The method of claim 18 wherein the filtering comprises filtering

2   using a modified bilateral filter without division operations.

1     20.    The method of claim 18 wherein the filtering comprises denoising
2    the mosaic data responsive to determining a difference of mosaic data of one
3    and another pixel locations being less than a threshold and sharpening the
4    mosaic data responsive to determining the difference of the mosaic data being
5    greater than the threshold.

1     21.    The method of claim 20 further comprising applying square root
2    operations to the mosaic data of the one and the another pixel locations, and
3    wherein the determining comprises determining the difference after the applying.

1     22.    A digital image device comprising:
2    an imaging system configured to provide digital image data of a plurality
3    of colors of an image, wherein the image data comprises a plurality of sets
4    individually comprising mosaic data of one of a plurality of colors at a plurality of
5    pixel locations; and
6    processing circuitry coupled with the imaging system and configured to
7    access the mosaic data of the plurality of sets, to sharpen at least some of the
8    mosaic data of the sets, and to demosaic the mosaic data after the sharpening
9    to provide composite image data capable of being utilized to provide a
10   representation of the image.

1     23.    The device of claim 22 wherein the processing circuitry is
2    configured to sharpen at least some of the mosaic data using a robust
3    estimation filter.

1     24.    The device of claim 22 wherein the processing circuitry is
2    configured to sharpen at least some of the mosaic data using a modified bilateral
3    filter without division operations.

1     25.    The device of claim 22 wherein the processing circuitry is
2    configured to apply square root operations to the mosaic data to sharpen the at
3    least some mosaic data.

1    26.    The device of claim 22 wherein the processing circuitry comprises
2    processing circuitry of a digital camera.


1    27.    An article of manufacture comprising:
2    a processor-usable medium comprising processor-usable code configured
3    to cause processing circuitry to:
4    access digital image data of a plurality of colors of an image,
5    wherein the image data comprises a plurality of sets individually comprising
6    mosaic data of one of a plurality of colors at a plurality of pixel locations;
7    apply a robust estimation filter to the mosaic data of the respective
8    ones of the sets; and
9    combine the filtered mosaic data to provide composite image data
10   capable of being utilized to provide a representation of the image.


1    28.    The article of claim 27 wherein the processor-usable code is
2    configured to cause the processing circuitry to apply the robust estimation filter
3    comprising a modified bilateral filter without division operations.


1    29.    The article of claim 27 wherein the processor-usable code is
2    configured to cause the processing circuitry to apply the robust estimation filter
3    to denoise and to sharpen the mosaic data in a common processing step.


1    30.    The article of claim 27 wherein the processor-usable code is
2    configured to cause the processing circuitry to denoise the mosaic data
3    responsive to a determination of a difference of the mosaic data of one and
4    another of the pixel locations being than a threshold and to sharpen the mosaic
5    data responsive to a determination of the difference of the mosaic data being
6    greater than a threshold.


1    31.    The article of claim 30 wherein the processor-usable code is
2    configured to cause the processing circuitry to apply square root operations to
3    the mosaic data of the one and the another pixel locations prior to the
4    determinations.